REMARKS

Claims 1-17 and 19-26 are now pending in the application. Claims 13-17 and 19-26 have been withdrawn from consideration The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 112

Claim 10 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed.

Claim 10 is indefinite in that it is unclear how the melt-spun ribbon has been milled "with a cooling roll". Claim 10 has been amended to call for the magnetic powder to have been obtained by milling a melt spun ribbon of the alloy produced on a cooling roll. Therefore, reconsideration and withdrawal of this rejection is respectfully requested.

REJECTION UNDER 35 U.S.C. § 102/103

Claims 1-12 stand rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious in view Schultz (Rare-Earth Magnets and their Applications, Vol. 1, pp. 199-204). This rejection is respectfully traversed.

The Examiner alleges that one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because the alloys taught by Schultz have compositions that are encompassed by the instant claims and are made by a process which is similar to, if the not the same as, the Applicants' process of making the instantly claimed alloy.

Furthermore, in the Response to Arguments section of the outstanding Office Action, the Examiner alleges that the Applicants are not claiming a bonded magnet, but rather are claiming a magnetic powder. Moreover, the Examiner alleges that the properties of the bonded magnet do not lend patentability to the claimed powder in that the properties of the bonded magnet are not necessarily the direct result of the magnetic powder, but rather may be a function of how the bonded magnet is made including all process operating conditions.

Applicants respectfully assert, however, that the Examiner has not considered the claimed magnetic powder as a whole. More particularly, Applicants respectfully assert that when the magnetic powder is mixed with a binding and then molded into an isotropic bonded magnet, as claimed, the claimed magnetic powder exhibits unexpected results in comparison to Schultz.

More specifically, the maximum magnetic energy product is greater than that achieved by Schultz. This is evident when comparing Table 1 of the application, a portion of which has been provided below, with Table 2 of Schultz.

Sample No.	(BH)max (kJ/m^3)
1 (Comp. Ex.)	75.6
2 (This Invention)	104.8
3 (This Invention)	113.2
4 (This Invention)	115.9
5 (This Invention)	112
6 (This Invention)	102.7
7 (Comp. Ex.)	79.1

Portion of Table 1

As can be seen in Table 1, the claimed magnetic powder, when formed into an isotropic bonded magnet, achieves a maximum magnetic energy product of at least 102.7 kJ/m^3. In contrast, the magnetic powder of Schultz, when formed into a bonded magnet, only achieves a

maximum magnetic energy product of 74.7 kJ/m^3, which is much less than that achieved by the claimed magnetic powder.

Furthermore, claim 1 has been amended to call for the soft magnetic phase to be constrained through the coupling of the surrounding hard magnetic phase so that the magnetic powder exhibits functions like a hard magnetic body. Schultz contains no suggestion or motivation to utilize such a composite structure. As such, Applicants respectfully assert that due to the unexpected results achieved by the claimed magnetic powder and the lack of suggestion or motivation provided by Schultz to utilize a composite structure wherein the soft magnetic phase is constrained to act like a hard magnetic body, the claimed magnetic powder is neither anticipated nor obvious in view of Schultz. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wang et al (J. Appl. Phys., Vol. 81, No.8, 15 April 1997, pp. 5097-5099). This rejection is respectfully traversed.

The Examiner alleges that Wang et al teaches a specific example alloy that, with the exception of the boron content, is completely encompassed by the instant claims. The Examiner further alleges that one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because the example alloy taught by Wang et al differs only in the boron content, but is so close that one would have expected Wang's alloy and claimed magnetic powder to have the same properties.

Claim 1, as stated above, has been amended to further define the soft and hard magnetic phases of the magnetic powder. More particularly, Claim 1 has been amended to call for the soft magnetic phase to be constrained through the coupling of the surrounding hard magnetic phase so that the magnetic powder exhibits functions like a hard magnetic body. This amendment is supported on pages 14 and 15 of the application.

> "The magnetization of the soft magnetic body readily changes its orientation by the action of an external magnetic field. Therefore, when the soft magnetic phase coexists with the hard magnetic phase, the magnetization curve for the entire system shows a stepped "serpentine curve" in the second quadrant of the B-H diagram. However, when the soft magnetic phase has a sufficiently small size of less than several tens of nm, magnetization of the soft magnetic body is sufficiently and strongly constrained through the coupling with the magnetization of the surrounding hard magnetic body, so that the entire system exhibits functions like a hard magnetic body."

In contrast, Wang et al teaches a magnetic alloy composition that functions like a soft magnetic body. Furthermore, the teaching of an alloy that functions like a soft magnetic body directly teaches away from the claimed magnetic powder. Wang et al, on page 5098, column 2, lines 19-23, states, "The effect of annealing temperature (T_u) on the magnetic properties of $Nd_{8.16}Dy_1Fe_{85.26}Nb_1B_{4.58}$ samples is shown in Figure 5. At each temperature, the samples were heated for 20 min. The as-quenched samples were magnetically soft with a coercive field of about 0.8 kA/m." (emphasis added) By teaching an alloy that is magnetically soft, Wang et al contains no suggestion or motivation to utilize a magnetic alloy that functions like a hard magnetic body. By containing no suggestion or motivation, and by directly teaching

away from the claimed magnetic powder, it would not have been obvious to utilize the teachings of Wang et al to arrive at the claimed magnetic powder.

Claims 1-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kojima et al (J. Appl. Phys., Vol. 87, No. 9, 1 May 2000, pp. 6576-6578). This rejection is respectfully traversed.

The Examiner alleges that Kojima et al teaches a specific example alloy that, with the exception of the rare-earth content, is completely encompassed by the instant claims. The Examiner further alleges that one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because the example alloy taught by Kojima et al differs only in the rare-earth content, but is so close that one would have expected Kojima's alloy and claimed magnetic powder to have the same properties.

Applicants respectfully assert, however, as stated above in the rejection under Schultz, that the Examiner has not considered the claimed magnetic powder as a whole. More particularly, Applicants respectfully assert that when the magnetic powder is mixed with a binding resin and then molded into an isotropic bonded magnet, as claimed, the claimed magnetic powder exhibits unexpected results in comparison to Kojima.

More specifically, the maximum magnetic energy product is greater than that achieved by Kojima et al. Again, this is evident when comparing Table 1 of the claimed invention with Figure 1 of Kojima et al. In Figure 1 of Kojima et al, the maximum magnetic energy product (BH)max is well below the maximum magnetic energy product achieved by the claimed magnetic powder. More specifically, the claimed magnetic powder achieves a maximum magnetic energy product ranging between 102.7 and 115.9 kJ/m^3. In contrast, the maximum magnetic energy product of the alloys taught by Kojima et al which the Examiner

alleges are encompassed by the claimed magnetic powder, only achieve a maximum magnetic energy product of about 80 kJ/m^3. As such, Applicants respectfully assert that the unexpected results of the claimed magnetic powder render the claimed magnetic powder unobvious in view of Kojima et al.

Claims 1-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mohri et al (USPN 4,765,848). This rejection is respectfully traversed.

Applicants respectfully assert that although Mohri teaches a total rare earth content that overlaps the claimed range of 7.1 – 9.9 at%, each example taught by Mohri utilizes a total rare earth content of 17%. More specifically, referring to Tables 1-8 of Mohri, each example enumerated contains 17% total rare earth content. This is far greater than the claimed range of 7.1 – 9.9 at%. As such, although Mohri allegedly teaches an alloy composition that overlaps the claimed composition, the subject matter taught by Mohri is also not taught with sufficient specificity to anticipate the claims. Moreover, by not teaching the rare earth content with sufficient specificity, the claimed range would not have been obvious. As each example taught by Mohri contains 17% rare earth content, there is no suggestion or motivation to utilize the claimed narrow range of 7.1 – 9.9 at%, and therefore, the claimed range is not obvious.

Furthermore, Mohri teaches a composition that requires the elements Ce and La. Dependent claim 6 of the present invention calls for R to be comprised of rare earth elements containing Nd and/or Pr. As Mohri explicitly teaches the necessity of utilizing Ce and La in the magnetic alloy, Applicant respectfully asserts that the subject matter of dependent claim 9 should be in condition for allowance in view of the teachings of Mohri. That is, there is no suggestion or motivation to utilize rare earth elements containing mainly Nd and/or Pr. Absent this motivation, the subject matter of dependent claim 6 would not have been obvious.

Therefore, reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a) are respectfully requested.

DOUBLE-PATENTING

Claims 1-12 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 to 14 and 24 to 34 of copending Application No. 09/871,600 and claims 1 to 14 and 13 to 33 of copending Application No. 09/875,789.

Applicants elect to file a terminal disclaimer, included herewith, in order to overcome the double-patenting rejection. Therefore, reconsideration and withdrawal of this rejection is respectfully requested.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: Dec 30, 2002

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ATTACHMENT FOR CLAIM AMENDMENTS

The following is a marked up version of each amended claim in which underlines indicates insertions and strike-throughs indicate deletions.

1. (Twice Amended) A ~~Magnetic~~ magnetic powder ~~composed of~~ comprising:

an alloy composition represented by $R_x(Fe_{1-y}Co_y)_{100-x-z-w}B_zNb_w$ (where R is at least one rare-earth element, x is 7.1 – 9.9 at%, y is 0 - 0.30, z is 4.6 – 6.9 at%, and w is 0.2 – 3.5 at%)~~,~~; and

the magnetic powder ~~being constituted from~~ including a composite structure having a soft magnetic phase and a hard magnetic phase, the soft magnetic phase being constrained through the coupling of the surrounding hard magnetic phase so that the magnetic powder exhibits functions like a hard magnetic body,

wherein the magnetic powder has magnetic properties in which, when the magnetic powder is ~~formed into an isotropic bonded magnet~~ mixed with a binding resin and molded into an isotropic bonded magnet having a density ρ [Mg/m^3] ~~by mixing with a binding resin and then molding~~, ~~the~~ a maximum magnetic energy product $(BH)_{max}$[kJ/m^3] ~~of the bonded magnet~~ at room temperature satisfies the relationship represented by the formula $(BH)_{max}/\rho^2[x10^{-9}J\cdot m^3/g^2] \geq 2.2$, and ~~the~~ an intrinsic coercive force (H_{CJ}) ~~of the bonded magnet~~ at room temperature is in the range of 320 - 720 kA/m.

10. (Twice Amended) The magnetic powder as claimed in claim 1, wherein the magnetic powder has been obtained by milling a melt spun ribbon of the alloy ~~with~~ produced on a cooling roll.